

WG on system aspects
held besides the 28th Aladin/Hirlam Workshop, Toulouse, 19/04/2018
Notes (by M. Derkova, SHMU)

Topics:

1. Scalability and efficiency
2. Validation tools
3. Diagnostics parameters
4. Single precision codes
5. LBC
6. Tools for developments in OOPS
7. AOB

1. Scalability and efficiency

Daniel and Jeanette informed the WG about the contacts established with the Barcelona Supercomputing Center (BSC) with the aim to collaborate on the code optimisation and on the improvement of the scalability and efficiency of our NWP code (the task requested by HIRLAM Council with available budget). BSC does have experience with the analysis and profiling of the earth system models codes, they are part of ESCAPE project, but the LAM aspects were not addressed much in the scalability task. In H-A consortia there is a lack of manpower and code optimisation expertise, thus it would be beneficial to built up such knowledge via cooperation with recognized institution. These ideas were reflected in the discussion.

A specific aspect of the discussion was how to organize and recognize this collaboration between HIRLAM and BSC. Should this be reflected in the common work plans as an A-H activity ? The answer given in the System meeting group was that the final decision to go ahead was on the side of HIRLAM, since this consortium will provide the funding (and decide in its own rights). Nevertheless, the BSC work should be followed by one or two HIRLAM staff, which was found necessary for support to code installation and which could help train specific HIRLAM staff to code optimization and HPC issues, importing knowledge and expertise from the BSC group. This specific activity of HIRLAM staff should be described in the SY1 work package of the RWP-2019.

2. Validation tools

Alexandre presented new tools developed by him for code validation: checkpack and ciboulette (python+html). Checkpack is a new tool to launch mitraille tests. Ciboulette parses the "NODE" outputs and compares them against the reference. It is in principle extendable for new configurations that require norms checking (i.e. not e923 types). Both tools should promote and make easier the usage of mitraille for validation of new individual code contributions and of whole code cycles. It shall not be difficult to install those on other machines, but the interface to local scheduler shall be prepared. It would be nice to install these tools on ecmwf HPC as well.

3. Diagnostics parameters

An increased need for new diagnostic parameters out of NWP models is evident. The initiative to coordinate the work on those has been revitalized by ACNA with preparation of inquiry on existing tools, either external (gl,...) or internal in fpos among ALADIN and HIRLAM NMSs. It was commented that some of those locally developed parameters might not be ready to be shared within the A-H community - a column to be added in the google sheet table. Also, several parameters exist with the same name but different meanings (many CAPEs), or very similar parameters are coded under different names - all those are to be revised. The local external tools used to compute diagnostics parameters are not as efficient as FPOS. HIRLAM admits gl can cease one day. The discussion on diagnostic parameters will continue at HMG-CSSI meeting => item in RWP2019.

4. Single precision codes

A discussion on the single precision (SP) code was held. The SP code exists in CY43t2 (already in _main branch) for ARPEGE and AROME with some open issues in physics. There is very little code ready for SURFEX. Data assimilation will stay in double precision (DP). The work on ALARO physics did not start at all. As SP is activated by CPP (preprocessor) macro, there is currently no possibility SP can be tested within mitraillette unless specific SP binaries are being built. However it is desired that such option would exist (test-bed approach). Open questions are (i) the burden of the SP code maintenance, (ii) how to keep parallel working ways with people developing in SP and others in DP ? HIRLAM plans some work in SP. In LACE for ALARO CMC no work started but it is discussed more and more.

5. LBC

The issue of preparation of LAM LBC data from the native ECMWF octahedral grid was discussed - the case when LBC files are to be prepared off-line for older dates. There are two configurations available to prepare FA files: a combination of 901 (from MARS GRIB files on a reduced Gaussian grid, not IFS operational octahedral cubic grid) with 927 and 903 (which requires full IFS ICMSH files). Configuration 901 transforms ECMWF grib files (downloaded from the MARS archive) into an Arpege file, but does not work with the new ECMWF geometry (cubic octahedral grid) and therefore requires an additional transformation. Operational LBC files from IFS are generated during the operational suite in ECMWF through the BC Optional Programme, that includes 2 additional forecast runs per day (both HRES and ENS starting at 06 and 18 UTC). Operational LBCs are not generated starting from MARS (at least for HRES). For 903, ECMWF for the time being do not wish to provide ICMSH files within the LBC-LAM Project¹. For purposes of testing and development of procedures that generate LBC files, one cannot use something as a ICMSH file from IFS, but the data from MARS (which indeed is the Centre's driving archive for users). While configuration 903 requires something as a (single) ICMSH file from IFS as input. There is thus a problem for testing/using 903, and one possibility could be to recreate the ICMSH files by collecting the fields from the MARS GRIB data. Question

¹ The problem is related to both: operational production of LBCs from IFS and when LBCs for some specific dates are done. Operational LBCs do not start from the MARS archive, but have the same disadvantage of going from octahedral to reduced Gaussian grid and then through 901 and 927.

however then is whether all fields present in an ICMSH file actually can be retrieved from MARS. Perhaps some are not stored in the ECMWF DB at all ? ECMWF has to be contacted to answer the questions.

6. Tools for developments in OOPS

Jozef asked whether any tools are available for code development in OOPS ? Ryad answered nothing exists in C++ layer. The question is to be asked at ECMWF and Meteo-France OOPS contact points.

7. AOB

Daniel asks whether the history of MF code repository is available ? With current practices of exchanging codes via .tar files (as is done between MF and ECMWF), more details about the code history, or the correct corresponding namelists, are indeed missing. The point was noted.